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CONNECTION ARCHITECTURE FOR XDSL NETWORKS AND INTERMEDIATE  
DISTRIBUTION FRAME REQUIRED BY SAID ARCHITECTURE

DESCRIPTION

The present invention relates to both the connection architecture for XDSL networks and to the intermediate distribution frame for such architecture.

In order to provide a high-speed data transmission service, such as by an ADSL line (Asymmetric Digital Subscriber Line) or in general xDSL, it is necessary to either join or  
5 separate the voice signal, sent by the switching exchange, and the high speed xDSL data signal supplied by the digital subscriber line access multiplexor (DSLAM) by means of a filter or splitter which sums or separates the signals depending on whether they are going to or coming from the subscriber.

The object of the present invention is to develop a connection architecture for xDSL  
10 networks that allows to place the filters or splitters in an intermediate distribution frame and to digitally monitor these filters at the intermediate distribution frame automatically, so that no wiring is required, which task is a complex one. In addition the text table is connected to the intermediate distribution frame independently of the DSLAM.

Therefore, the present invention lies within the scope of telephony and more  
15 specifically within the connection systems for xDSL lines, as well as the means required to effect these connections.

BACKGROUND OF THE INVENTION

As mentioned before, providing a high speed data service such as by an ADSL line requires joining the voice signal which arrives from the switching central to the xDSL high-  
20 speed signal provided by the digital subscriber line access multiplexor (DSLAM), that is, the device which provides access to high-speed lines. The summing or separation is effected by a splitter normally installed together with the DSLAM in the same electronic components cabinet.

Given the high cost of the DSLAM and splitter joint equipment, certain operators have  
25 preferred to purchase the components separately and to install the splitters and the DSLAM in different cabinets. This solution has a number of drawbacks, such as:

- The wiring must be double, from the intermediate distribution frame and the splitter cabinet in order to sum both signals, voice and xDSL, and then again to the intermediate distribution frame.

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- The test table must be connected to both the splitters and to the DSLAM.
- A switching matrix is required at the DSLAM and another at the splitter area in order to disable the splitters and signals to carry out measurements.
- Not all DSLAMs allow a switching matrix.
- 5 - Wiring between the splitters and the test table is complex and difficult to effect, particularly each time there are extensions.
- A demarcation point is required to measure the DSLAM side and the subscriber loop side, requiring a cutting and test point in the splitter area.
- Wiring is required between the cabinet housing the DSLAM and that housing the splitters, and between the switching exchange and the intermediate distribution frame, specifically with the vertical and horizontal sides.
- 10 - An intermediate distribution frame is required at the bridge to the vertical and horizontal side, further requiring a fixed wiring to the DSLAM.
- If the test table is installed at the DSLAM only the dominant operator lines can be measured, so that it is not possible to measure the status of a line rented to a different operator.
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Later and in order to solve part of the aforementioned drawbacks, nowadays and in certain cases the splitters have been integrated into the intermediate distribution frames, simplifying the wiring but with drawbacks remaining, such as:

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- The test table requires a switching matrix at the DSLAM and another at the splitter area.
- Not all current DSLAMs allow a switching matrix.
- A demarcation point is required to measure the DSLAM side and the subscriber loop side.
- 25 - The wiring between the test table and the intermediate distribution frame is complex.

Therefore, the object of the present invention is to provide a connection architecture which avoids the above described drawbacks, for which an intermediate distribution frame is provided which houses intelligent filters that can be monitored digitally, and therefore automatically, directly from the test table without requiring the use of a switching matrix at the

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DSLAM. Said monitoring is effected by a digital bus which can activate all measuring points of the various lines by a bus with a low number of wires, thereby greatly simplifying the wiring. Additionally, the test table is independent of all DSLAMs, so that it can measure both the lines of the dominant operator and those rented to other operators.

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### **DESCRIPTION OF THE INVENTION**

The disclosed invention for a connection architecture or XDSL networks and the intermediate distribution frame required for this architecture consists of achieving an architecture in which the filters are integrated in the intermediate distribution frame, thereby simplifying the required wiring. In addition, the test table is independent of any type of DSLAM, so that the use of switching matrices in the DSLAM is not required.

As an option it is possible to automatically monitor the filters by means of a smart card with relays that are activated by the test table, with the card being controlled by a digital bus with a low number of lines. This card can be installed at a later time, when the number of filters is so great that manual measuring becomes an onerous task. Adding the card does not involve a reconfiguration, simply adding services.

These smart cards that can be added later allow to obtain a demarcation point in which to measure the DSLAM and the subscriber loop sides, thereby allowing to install filters of other operators, with these filters configured so that only the subscriber loop and not the DSLAM side loop can be verified, as this corresponds to the second operator. This allows to integrate filters of other operators in the same intermediate distribution frame and with the same system.

Therefore the advantages of the current configuration is a greater and better operation, as the filters can be monitored automatically, the test table is independent of the DSLAMs, and costs are reduced by eliminating wiring from the test table to the DSLAM and the use of a switching matrix, while space is saved as it allows to place the filters of the dominant operator and those of other operators in the same intermediate distribution frame.

As regards the intermediate frame it will be configured such that it houses the filter cards for both the dominant operator and others, with these filter cards containing the configuration required to perform measurements on the DSLAM side and on the subscriber loop or only on the subscriber loop, as required.

Additionally, on said intermediate distribution frame is housed at least one smart card that contains relays activated by the test table allowing to digitally monitor the subscriber loop

for second operators and the DSLAM side as well for the dominant operator. This card is only installed when wanting to perform automatic measurements from the test table. The card is controlled by a digital bus which can activate all measurement points.

The digital bus is provided with two measurement wires, another two wires for power supply to the relays and as many wires as required to activate all the measurement points.

Connection of the filter cards will be achieved by connectors which when extracted connect directly the input (voice) and the output (voice and data) so that the voice is not disconnected and the service is not interrupted at the card removed.

## 10 DESCRIPTION OF THE DRAWINGS

As a complement to the description of the invention which will be made below and in order to aid a better understanding of its characteristics the present descriptive memory is accompanied by a set of drawings in which for purposes of illustration only and in a non-limiting sense the most significant details of the invention are shown.

15 Figure 1 shows a configuration scheme where the filter is separated from the DSLAM but in which the test table acts through the DSLAM.

Figure 2 shows the configuration scheme proposed herein in which the test table is independent of the DSLAM, allowing to place filters of other operators and to digitally monitor all filters automatically.

20 Figure 3 shows a schematic representation of the intermediate distribution frame required to provide the connection architecture for XDSL networks.

## PREFERRED EMBODIMENT OF THE INVENTION

25 In view of the aforementioned figures a description is provided below of a preferred embodiment for the invention, as well as an explanation of the drawings.

Figure 1 shows how the switching exchange (1) supplies the voice signal (2), which passes through the intermediate distribution frame (4) and reaches the filter or splitter (3) meant to join or separate the voice signal (2) and the high speed xDSL signal (7) provided by the digital subscriber line access multiplexor (DSLAM) (5), obtaining the signal (8) that then reaches the intermediate distribution frame (4) again and continues to the subscriber (9). The test table (6) is connected to the DSLAM and is not independent of it, so that in order to perform measurements on the filters two switching matrices are required, as well as the corresponding wiring between the filters (3) and the test table (6), which is complex and

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difficult to perform every time extensions are required. Also necessary is the corresponding wiring between the DSLAM (5) and the filters (3).

In figure 2 one can see the proposed solution for a connection architecture for XDSL networks, which allows digital and therefore automatic monitoring of the filters, avoids wiring and makes independent the test table (6) from the DSLAM (5), allowing to place second operators (11). Said figure shows how the test table (6) is independent from the DSLAM (5), and is connected directly to the intermediate distribution frame (4), by means of a digital bus (10), thereby allowing the entrance of second operators (11).

Figure 3 shows the intermediate distribution frame required for the above described configuration. This intermediate distribution frame (4) is internally provided with a number of filter cards (13), which may belong to the dominant operator or to other operators, and leaves space available for at least one smart card (12) which may be added later to provide a demarcation point for measuring either the subscriber side in the case of a second operator or both the subscriber line and the DSLAM line for the dominant operator.

This smart card contains relays that are activated from the test table (6), allowing to automatically monitor the filters (13), for which purpose the smart card (12) and the test table (6) are connected by a digital bus (10) which encompasses the intermediate distribution frames. This digital bus (10) is provided with at least two wires for power supply to the relays, another two for the signal and as many wires as required to activate all the measuring points, thereby eliminating the wiring between the filters and the test table and the use of two switching matrices.

The connections of the filter cards (13) are effected by the connectors (14) that allow to maintain the voice signal when the cards are extracted, as the voice is directly connected to the output, with voice and data available when connected. The high speed xDSL signal provided by the DSLAM (5) arrives through a connector (16), which can provide a service to as many cards as may be installed by means of an additional card or backplane (15).

It will be understood by those skilled in the art that the present invention is not limited to the embodiments shown and that many additions and modifications are possible without departing from the scope of the present invention as defined in the following claims.

**Claims**

1. Connection architecture for XDSL lines, characterised in that the filters or splitters are located in the intermediate distribution frame, and a test table is connected directly to the intermediate distribution frame independently of any type of DSLAM.  
5
2. Connection architecture according to claim 1, characterised in that after the filters have been installed in the distribution frame it is possible to install in said intermediate distribution frame at least one smart card which allows to connect the test table to the intermediate distribution frame, the smart card containing devices that can be activated from the test table to digitally and automatically monitor the filters or splitters.  
10
3. Connection architecture according to claim 2, characterised in that said smart card allows monitoring the subscriber loop of filter cards when provided for lines rented to other operators, and allows monitoring both the subscriber loop and the DSLAM signal for lines of the dominant operator.  
15
4. Connection architecture according to claim 2, characterised in that by means of said smart card filters of second operators can be placed in the same intermediate distribution frame.  
20
5. Connection architecture according to claim 2, characterised in that said smart card is actuated from the test table by means of a digital bus.
6. Connection architecture according to claim 5, characterised in that said digital bus is provided with two power wires, two measurement wires and as many wires as are required for activating all measurement points.  
25
7. Connection architecture according to claim 1, characterised in that in the intermediate distribution frame are located filters cards (13) of both the dominant operator and any second operators, the connectors (14), and the additional card or backplane (15) to which the DSLAM is directly connected by means of a connector (16).  
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8. Connection architecture according to claim 7, characterised in that the connectors (14), upon extraction of the cards, connect the input (voice) directly to the output (voice + data) so that the voice service of the extracted card is not disconnected.
- 5 9. Intermediate distribution frame for a connection architecture for XDSL lines, characterised in that in said distribution frame are located the filter or splitter cards, at least one smart card that allows to digitally monitor said filters, the output connectors, and an additional card or backplane at which arrives the signal from the DSLAM, by means of a connector (16).
- 10 10. Intermediate distribution frame as claimed in claim 9, characterised in that said smart card contains devices which are activated from the test table.
11. Intermediate distribution frame as claimed in claim 9, characterised in that said smart  
15 card allows monitoring the subscriber loop for any filter cards of second operators and monitoring both the subscriber loop and the DSLAM signal for filter cards of the dominant operator.
12. Intermediate distribution frame as claimed in claim 9, characterised in that by means of  
20 a smart card filters of second operators are placed in the same distribution frame.
13. Intermediate distribution frame as claimed in claim 9, characterised in that a digital bus is employed to act on said smart card from the test table.
- 25 14. Intermediate distribution frame according to claim 13, characterised in that said digital bus is provided with two power supply wires, two measurement wires and as many wires as are required to activate all measurement points.
15. Intermediate distribution frame according to claim 9, characterised in that the filter  
30 cards are connected by means of connectors which, when the cards are extracted, connect the input (voice) directly to the output (voice + data) so that the voice service of the extracted card is not disconnected.

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Fig.1.

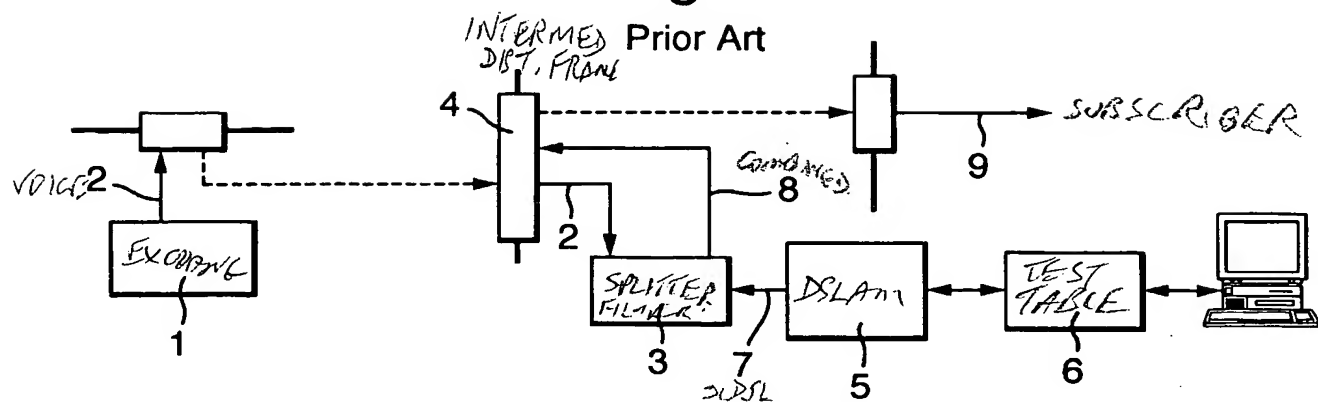
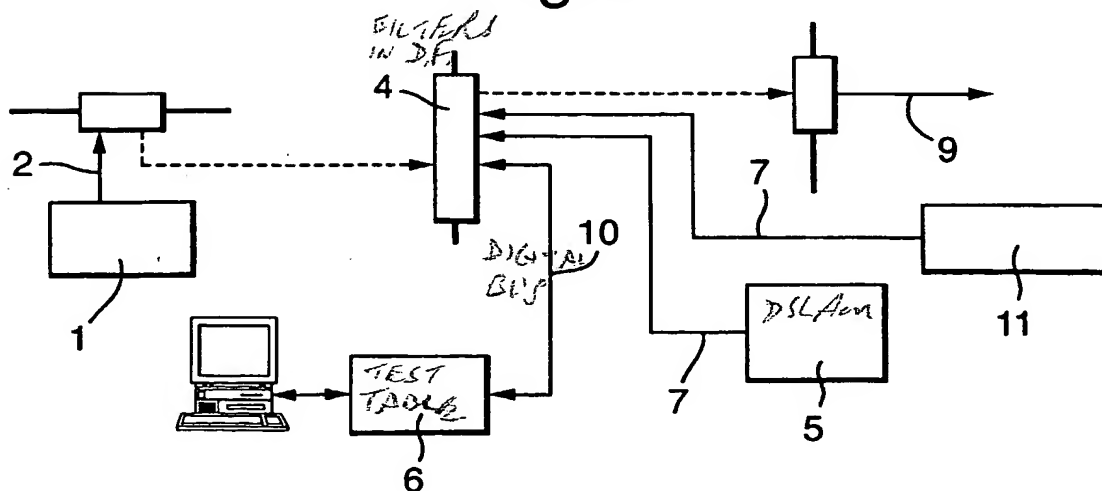


Fig.2.



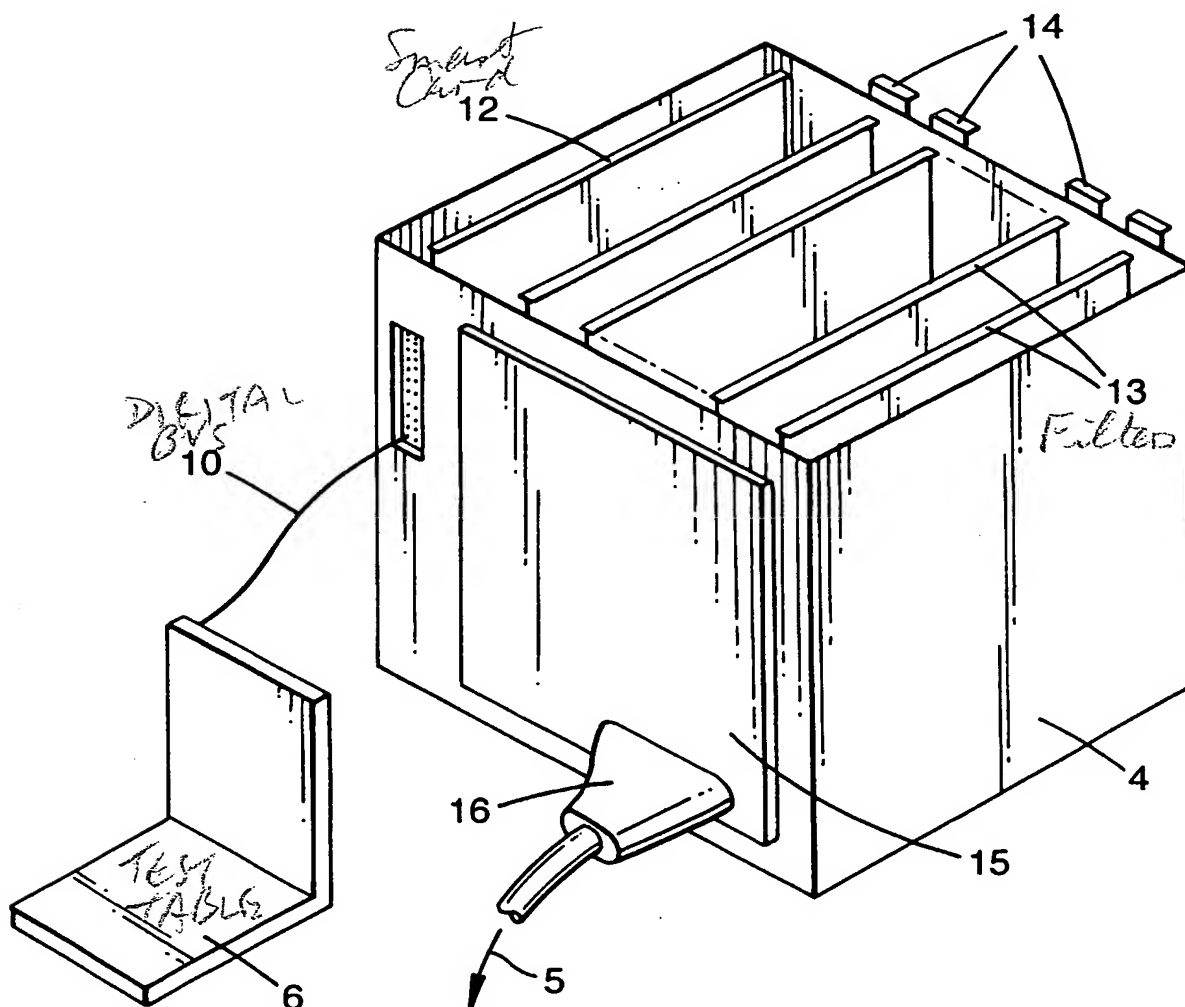
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Fig.3.

INT. DIST. FRAME



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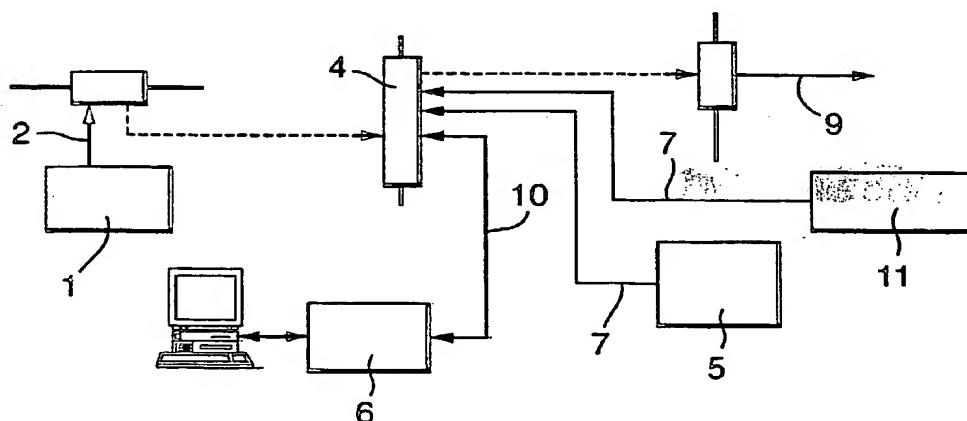
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(54) Title: CONNECTION ARCHITECTURE FOR XDSL NETWORKS AND INTERMEDIATE DISTRIBUTION FRAME REQUIRED BY SAID ARCHITECTURE



(57) Abstract: The connection architecture allows to digitally monitor the filters, directly connecting the test table to the intermediate distribution frame without requiring wiring to the DSLAM, so that in said intermediate distribution frame can be placed the filter cards of the dominant operators and of second operators, at least one smart card containing the relays that are activated from the test table, for which a digital bus is used, allowing to measure the subscriber loop for filters of second operators and the DSLAM signal as well for the dominant operator, further being provided with an additional card in charge of receiving and distributing the signal that arrives from the DSLAM, between the filters, and connectors to which are connected the filter cards so that when extracting them the input (voice) is connected to the output (voice + data) so that the voice signal is not disconnected.

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## INTERNATIONAL SEARCH REPORT

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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 65816 A (TURNSTONE SYSTEMS INC) 7 September 2001 (2001-09-07) column 2, line 19 -column 3, line 18 column 6, line 22 -column 7, line 30 figures 1, 3A	1-15
A	WO 01 93548 A (NOKIA INC) 6 December 2001 (2001-12-06) abstract column 5, line 19 -column 10, line 10; figure 1	1-15

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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